MOBILE VAPOR EVACUATION DEVICE

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VAPOR EVACUATION DEVICE

CONTINUATION HISTORY

This application is a continuation in part of U.S. Application 10/288,216, filed on November 5, 2002, which is a continuation in part of U.S. Application 10/087,326, filed on March 1, 2002, pending, which are both hereby incorporated by reference in their entirety.

BACKGROUND OF THE INVENTION

The present invention relates to the evacuation of hazardous and/or harmful vapors from a vessel or tanker vehicle. These vapors are typically vented into the atmosphere where they can cause environmental problems, or stored in the tanker vehicle where they can pose a danger, especially if they are flammable and/or volatile. Alternately, large stationary systems can be used to filter and scrub the vapor content of a vessel; however, these generally employ complicated techniques, and are fixed in their physical location, severely limiting their usefulness.

The invention proposed in this application is mobile, as well as vastly simplified in use, permitting inexpensive and easy use on all harmful vapor-carrying vessels, while simultaneously improving the environment and alleviating safety concerns in storing and disposing of these vapors.

OBJECTS OF THE INVENTION

One object of the invention is to provide a vapor evacuation device that can evacuate vapors from vapor-laden vessels.

Another object of this invention is to provide a vapor evacuation device which combines harmful vapors into an easily disposable and relatively benign liquid and/or gas.

Still another object of the invention is to provide a vapor evacuation device which is mobile and/or portable.

Other objects and advantages of this invention shall become apparent from the ensuing descriptions of the invention.

SUMMARY OF THE INVENTION

According to the present invention, the vapor evacuation device comprises a mobile housing encasing at least one fluid line configured to draw vapors from a tank via an inlet, and to feed these vapors through solution. This process yields a relatively benign liquid solution together with vapors which can be drained and vented, respectively, when convenient to the operator.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings illustrate an embodiment of this invention. However, it is to be understood that this embodiment is intended to be neither exhaustive, nor limiting of the invention. They are but examples of some of the forms in which the invention may be practiced.

FIG. **1** shows a diametrical longitudinal cross section of an exemplary embodiment of a mobile vapor evacuation device.

FIG. **2** shows an elevational view of a vapor evacuation device configured as part of a tanker truck.

FIG. **3** shows an elevational view of a vapor evacuation device configured as a standalone trailer and in use with a rail tanker car.

DETAILED DESCRIPTION OF EXEMPLARY EMBODIMENTS

Without any intent to limit the scope of this invention, reference is made to the figures in describing the various embodiments of the invention. Referring to FIGS. **1** through **3**, a mobile vapor evacuation system **100** is pictured, which is used to purify vapors evacuated from a vessel **101**. Transport vessel **101**, which can contain gaseous or liquid chemicals or other products, will often leave vaporous residue in vessel **101** when evacuated of its primary payload. It is desirable, for environmental and safety reasons, to evacuate and clean, or "scrub" this vaporous residue from vessel **101** using vapor evacuation system **100**.

Vapor evacuation system **100** includes housing **106** which encloses the inner components of vapor evacuation system **100**. Within housing **106** is fluid passageway **103**, which can be any type of pipe or conduit capable of carrying fluids. Fluids can enter through first aperture **102**, which can be a valve or fitting or simply the opening of the pipe or conduit that permits a fluid communication between vessel **101** and vapor evacuation system **100**.

Downstream of first aperture **102** is second aperture **108** which provides the fluid communication between housing **106** and fluid passageway **103**. This second aperture **108** can be a single exit port, or, as shown in FIG. **1**, a series of perforations in fluid passageway **103**.

Downstream from second aperture **108**, vapor evacuation device **100** can have third aperture **109**, which may, like first aperture **102**, be a valve, fitting or the like. Third aperture **109** may be used for evacuating fluid, such as scrubbing solution Δ, which enters fluid passageway **103** and/or housing **106**. Scrubbing solution Δ can be myriad different chemicals, such as caustic soda or the like. Scrubbing solution Δ can also be formulated to address a particular chemical concern or to achieve a desired result depending upon vapor evacuation device's **100** application.

Vapor evacuation device **100** is mounted upon a mobile chassis **201**, such as a wheeled chassis as in FIG. **3**. It can also be on a self-propelled vehicle, such as a truck, as pictured in FIG. **2**. Alternately, it can be mounted on skids, pontoons, tracks, treads or on a floating chassis, such as a boat.

Vapor evacuation device **100** will generally include atmospheric vent **105** which is used to release the pressure that builds within housing **106** as a result of operation of vapor evacuation device **100**. Additionally, a drain can be placed at the bottom of housing **106** in order to more completely evacuate vapor evacuation device **100** of all fluids left behind after use.

It is also possible to have a sight glass installed in housing **106** so that the contents of vapor evacuation device **100** can be verified or inspected to ensure

correct or desired operation. Further, a motor can be positioned in various locations along fluid passageway **103** in order to expedite the flow of fluid through vapor evacuation device **100**.

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In operation, one method of use is to first fill vapor evacuation device **100** with scrubbing solution Δ by connecting first aperture **102** to the scrubbing solution Δ source, such as a faucet, tank or other containing device. Third aperture **109**, if present, will be closed to prevent the escape of scrubbing solution Δ from vapor evacuation device **100**.

A user will then connect first aperture **102** to vessel **106**, which has some internal pressure generally greater than that of the ambient atmospheric pressure outside of vapor evacuation device **100**. This pressure variation arises as a result of the vaporous residue in vessel **101** being at a lower atmospheric pressure than the relative environment. Such differential in pressure causes a natural flow of vapors α into fluid passageway **103**.

Housing **106** is filled with a scrubbing solution Δ. First aperture **102** may then be opened to permit fluid communication between vessel **101** and vapor evacuation device **100**. Vapors α will proceed to flow into first aperture **102** and subsequently out of second aperture **108** into scrubbing solution Δ. Once vapors α flow through scrubbing solution Δ, a chemical reaction therein yields a more benign fluid and environmentally-sound vapors which can be released into the atmosphere without fear of contamination of the air.

Various substances may be added to scrubbing solution Δ within tank to achieve assorted results, such as odor control, neutralization and the like by adding selected chemicals through access door **104**. Such chemicals may also be added via other valves previously mentioned, if desired or needed. Additionally, since vapors α will build over the course of recirculating, a pressure relief valve **105** can also be employed to prevent explosion, or enable the user to "bleed off" pressure as needed.

Although only a few exemplary embodiments of this invention have been described in detail above, those skilled in the art will readily appreciate that many modifications are possible in the exemplary embodiments without materially departing from the novel teachings and advantages of this invention. Accordingly, all such modifications are intended to be included within the scope of this invention as defined in the following claims.